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ABSTRACT

This study attempted to ameliorate the educational deficits of infants using structured tutorial programs of language and concept training in the home. It was part of a larger project whose purpose was to determine the age at which intervention will produce maximum acceleration of cognitive development. Subjects were 20 disadvantaged 8- and 24-month-old children randomly assigned to experimental and control groups. Female tutors worked with each experimental subject in his home 1 hour a day, 5 days a week, over 1 year. In the first 3 or 4 weeks of training rapport was established, and the child's development was studied. Language training stimulated infants to imitate actions and sounds, identify and name objects, verbalize needs, use picture books, develop elaborative language, and use internal dialogue. Concept training stimulated infants to understand concepts of body image, space, number, time, and classification. On initial testing both groups of infants were average in intelligence and motoric development, but below their chronological age in language and concept development, and in interpretation of symbolic representation. Posttests showed that the experimental group had consistently higher scores on IQ, language, and conceptual development tests. There were no significant differences in sensory-motor development. (NH)

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A Tutorial Language Program for Disadvantaged Infants

Genevieve Painter

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A Tutorial Language Program for Disadvantaged Infants

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I. The Case for Infant Training

It is generally agreed that children of the poor are not adequately prepared to achieve their respectful place in society. This is not only a social loss, but a personal loss as well. Where the difficulty lies, no one is quite sure. A study of infant development (birth to 16 months) revealed no differences along socioeconomic lines; however, developmental deficits are well established in children from culturally disadvantaged families by the age of three (Bayley, 1965; Pasamanick and Knoblock, 1961). We do not know the best time for intervening in the developmental process, for we do not know precisely which years are critical for later development. However, research suggests that the earlier intervention begins, the greater are the gains which occur (Bloom, 1964; Kirk, 1964). The question of whether or not preschool experience can help to compensate for developmental deficits is no longer seriously debated; the controversy now focuses on the defenders of the traditional or child-centered nursery school program and the proponents of a structured preschool curriculum. Reports to date of research projects involving curriculum innovation seem to indicate that a partially structured curriculum, as compared with the completely unstructured, is more likely to effect significant changes in the development of disadvantaged preschool children and infants (Weikart, 1967; Karnes et al., 1966; Painter, 1967, 1968).

Bloom (1964), in reviewing the effects of variations in environment on intelligence, estimated that 50 percent of intellectual development takes

place "between conception and age 4, about 30 percent between ages 4 and 8, and about 20 percent between ages 8 and 17" (p.88). Other investigators support Bloom and suggest that children of deprived environments can make greater cognitive gains when intervention begins early in life. In a study by Skeels and Dye (1939), 13 mentally retarded children ages 7.1 to 35.9 months were transferred from an orphanage to institutional wards for older, high-grade, mentally defective girls who gave the infants extensive care, attention, and affection. The control group of similar age and intelligence remained at the orphanage and received no special attention. The experimental group showed a mean IQ increase of 27.5 points; the control subjects showed a mean loss of 26.2 IQ points. Skeels (1964) followed up the experimental and control children 21 years later. Eleven of the 13 experimental children had been placed in adoptive homes in childhood. All were self-supporting and none a ward of an institution; their median grade completed in school was twelfth grade. Of the 12 control children who had remained in the orphanage for a prolonged period, one-half were wards of institutions. The median grade they completed was third grade.

Kirk (1958) reported on two groups of mentally retarded children being raised in an institution. One group of 15, with a mean age of 4 1/2 years, was given preschool education each day. The mean increase in their IQ scores was over 10 points. Six of the experimental children were later paroled from the institution, while a contrast group of similar age and mental ability was left in the wards. The latter group showed a mean decrease of 6 IQ points.

Kirk (1962) later compared two groups of mentally retarded children living in the community. The experimental group was given preschool edu-

cation. Followup studies after age 6 showed that those who had the advantage of foster-home placement in addition to preschool training made the greatest mental and social growth. Children brought up in their own inadequate homes and given only preschool class improved, but to a lesser extent. Those who had neither a change of environment nor preschool changed for the worse when they changed at all.

Other studies show that when retardates enter school at 6 years of age, although school environment is more stimulating than home environment, the increase in IQ is only 6 or 7 points (Kirk, 1958; Goldstein, Moss, and Jordan, 1964; Smith and Stroud, 1960). The studies also reveal that retardates who receive stimulation beginning at ages 1 to 3 differ from contrast groups by over 50 IQ points. When stimulation is introduced at ages 4 and 5, the increase in IQ is less than one-half of that produced by stimulation at an earlier age. And when intervention begins as a result of school entry at age 6, the increase in IQ is only half the increment accruing when the child begins preschool 2 years earlier (Kirk, 1964).

It seems obvious that the emphasis should be on the prevention of educational deficits rather than compensation for deficits which inadvertently develop. Therefore, interest in the education of infants is now increasing at a phenomenal rate. Research and service organizations are attempting to educate infants in their homes, in community centers, and in day-care centers; these organizations are also teaching groups of mothers to educate their own infants. School systems are beginning to take responsibility for education at all levels and some are developing programs which include teaching parents methods of child training, as well as preschool programs for children from

birth to 4 years. Working cooperatively in this effort are public health nurses, social workers, other helping professionals, and nonprofessional mothers trained as study-group discussion leaders.

The U.S. Office of Economic Opportunity has funded 36 Parent-Child Centers for low-income families in various parts of the country. These centers offer educational services to parents and their children from birth to 3 years. Several of these centers have infants as young as 6 months in daily, 2 hour "school" programs. Many centers are using the educational play activities described in this paper and are training mothers to assist the professional teachers in the classrooms. Mothers are also being trained to lead other mothers in study-group discussions on child-rearing practices.[1]

II. An Overview of the Tutorial Language Program

Much has been written describing the spontaneous intellectual growth of infants (Gesell, 1940; Piaget, 1963), but little can be found concerning either theory or practice of planned acceleration of development. In answer to the question "What shall we teach?" this paper presents a rationale for and description of infant language training, including specific suggestions for that training. It is the belief of the writer that these suggestions can be used by professional teachers, paraprofessionals after some training, and parents. The instructions in this paper are directed toward the teacher.

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[1] The text which is read and discussed in these mothers' study groups is Children: the Challenge by Dreikurs, Rudolf, and Soltz, Vicki, Meridith Press, 1964. This book offers a simple, practical application of a theoretically based philosophy of democratic child-rearing which is applicable to middle class as well as low socioeconomic families.

An adaptation has been made for parents who serve as teachers.[2]

Included in the training program is training for conceptual development, because culturally disadvantaged children have generally been found to perform at a lower level than their advantaged peers in both areas. However, the differentiation between language growth and conceptual growth in an individual is only theoretical, since they actually proceed together in the spontaneous development of the child. They are presented independently of each other in this paper for purposes of structuring the program.

Culturally disadvantaged infants are not usually deficient in motor development. However, infants learn through sensory input, and motor skills are developing during the first year of life. Sensory-motor training can be used to facilitate the development of concepts and language. Visual, auditory, tactual, kinesthetic, olfactory, and gustatory modalities should be stressed independently and in combinations in the various activities. Infants should be encouraged to give both verbal and motor responses. An appropriate age for initiation of this phase of intervention is between 10 and 12 months;

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[2] Painter, Genevieve. Teach Your Baby. Simon and Schuster, Spring, 1970.

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earlier training is not proposed here because language development is not sufficiently advanced.

The training procedures to be described here were developed in connection with a research project[3] that was part of a larger project designed to determine the strategic age at which environmental intervention will produce maximum acceleration of cognitive development in culturally disadvantaged children.[4] The initial phase of the study of infants had two major purposes: (1) the development of a tutorial program for infants in their homes and (2) the evaluation of the infants' progress after a 1-year period of tutoring.

Twenty Negro and Caucasian infants, male and female, who were siblings of 4-year-olds attending an experimental nursery school for the disadvantaged, composed the sample. They ranged in age between 8 and 24 months; medical examination revealed no evidence of physical limitation, and measured intelligence was within the range of 80 to 120 on the Cattell Infant Intelligence Scale (Cattell, 1960). They were randomly assigned to experimental and and control groups.

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3 The complete research report is contained in Painter, Genevieve: (1) The Effect of a Tutorial Program on the Intellectual Development of Disadvantaged Infants, 1967, available on microfilm from Dissertation Abstracts, Ann Arbor, Michigan: and (2) Infant Education, 1968, San Rafael, California: Dimensions Publishing Co. Included in both volumes are assessment procedures, full review of the literature, rationale of the training program, logistics of tutoring in the home, and complete analysis of data, as well as the training program which is presented in this paper with modifications.

4 Karnes, Merle B. Research Project on the Disadvantaged, Supported by a grant from the Bureau of Research, U.S. Office of Education (USOE5-1181, Contract 6-10-235).

Female tutors worked individually with each experimental subject in his home for 1 hour a day, 5 days a week, over a period of 1 year. The tutors had varying professional backgrounds--in music, child development, nursing, and elementary education. They were selected on the basis of their experience and interest in working with young children. An orientation week initiated tutor training.

An assessment of each experimental subject was made to determine his level of development, content of the program, and teaching procedures. In general, the assessment suggested that training should emphasize language development, symbolic representation, and concept formation. Each child was given a program designed to ameliorate the developmental lags found in the initial assessment. The program was changed in the course of treatment to take account of progress. During weekly home visits, the writer, who served as program supervisor, together with the child's tutor, observed the child's performance and evaluated the effectiveness of the training. The child's progress was then compared periodically with developmental schedules. Inservice training of tutors continued on a weekly basis throughout the year. The supervisor met individually with tutors and conducted group training sessions. At these sessions the activities were evaluated for their appropriateness to a given child's progress and for their general interest to children of this age.

The first 3 or 4 weeks of the training were spent in nonstructured activities to establish rapport and to study the child's development. During this time gross motor play with balls, wagons, and pull toys was initiated, as well as small-muscle activities with beads and puzzles. Gross motor play was decreased as the structured program was initiated, and the child was then required to sit at a table and work for longer periods of time. A Baby Tenda (a square table about 18 inches high, with a canvas seat in the

middle) was used for the younger children; a child-size table and chair or a junior chair at a kitchen table was used for older children.

As many as 13 tasks were given the child in a single session to maintain his interest while working. His attention span was gradually increased by extending the length of time on an individual activity. After the child became accustomed to working at length at a single activity, then the number of activities was again increased so that more types of tasks could be mastered. Each child was trained to sit and work at his table for a full hour at each session; he was able to work without frustration for this period of time because he experienced satisfaction in his work. At no time were extrinsic rewards given to a child. Encouragement and intrinsic motivation (satisfaction in his own accomplishment) were the only reinforcers used.

III. EDUCATIONAL PROGRAM

A. Language Training

It is generally agreed that an infant utters his first word when he is about 1 year old. However, he is actually learning about how to speak from the moment of the birth cry. For the first weeks his crying is undifferentiated except that he may cry louder or softer at times. Soon the mother is able to tell if the child is crying because of hunger or because of discomfort due to the need of a diaper change. The infant is learning about the use of his vocal mechanism by feeling the air flow in and out of his throat, nose, and mouth by sucking, swallowing, belching, and gurgling. Perhaps most important of all, he is learning that vocal activity can be useful in communicating wants and needs.

The infant understands what is said to him long before he is able to talk. He understands by the attending adult's actions and from the situation in which an event occurs. If the infant were told only, "Open your mouth," he probably would not understand. However, if his mother says, "Open your mouth" while she has a spoon in her hand and she is feeding him, he probably begins to understand what he is expected to do.

An outline of training procedures follows. The approximate time for instruction of a particular type of training is included, but is, of course, only an approximation.

1. Initiation of training: imitation of the actions of others (10 months)

During the first year of life, the infant engages in many imitative activities which are related to language development. When his mother smiles, he smiles in return. When he coos, his mother makes his sounds. He will learn to imitate the sounds of others, but he will first be able to imitate the actions of others. The following activities are suggested for teaching the infant to imitate movement; the teacher should do the movement and the child will soon learn to imitate.

Move your head from side to side.

Wave and say, "Bye, Bye."

Play "bouncy-bouncy." Bounce the infant up and down as you sit holding him on your lap. He will try to continue the movement even when you stop. (According to Piaget, he is learning how to make an interesting experience last).

Hit the table with your hand.

Wave a toy in the air.

Hit a toy with a stick.

Pretend to drink from a toy cup; give him the cup.

Hold a block in each hand and hit them together.

Pat your hands together as in "pat-a-cake."

While the child is sitting on your lap, facing you, put your forehead against his and say, "boom." Take your head away and do it again. The infant will learn to move his head toward yours.

Play with toys and let him imitate your movement.

2. Training the infant to imitate sounds (12 months)

The following imitative activities are suggested for teaching the infant to repeat sounds. Initiate these when the infant is babbling at you.

Say a sound that he has already said himself and laugh as you say it.

If he repeats the sound, you repeat it, too, thus playing a game.

Choose a simple sound which you have <u>not</u> heard him say before. Laugh

and see if he will say the new sound; if he does say it, repeat,

Smack your lips as in kissing.

Whistle and see if he will pucker up his lips and try to whistle.

Make a coughing sound.

Breath hard and make a panting sound.

Say: "Brrr," "aboo," "oh, oh," "grrr."

Put your finger over your mouth and say, "Sh."

Put your hand over your mouth, Indian style, and say, "Wah, wah, wah."

Play "This Little Piggy Went to Market." Let him have a turn to say "Wee, wee, wee."

Use the words and sounds that go naturally with an activity, "Wee," "zoom," "boom," "wow," "oh, oh," "all gone."

3. Training in identifying and naming objects (14 months)

Show the infant objects found in the home and tell him their names. If he is unable to say the words, encourage him to point to the object or to go and get it. "Where is the cup?" "Get your shoe." When he is able to name objects, encourage him to say the names. While you point to a bar of soap say, "What is this? Yes, soap."

4. Teaching the child to verbalize needs and wants (16 months)

When the child points to an item which he wants, tell him how to ask for it. If he is only able to say a single word and not pronounce it perfectly, accept his effort at first. For example, if he wants water but only points to the sink and grunts, tell him, "Water." He may only be able to say "wah-wah" at first. When his speech becomes more precise, say "wa-ter" very distinctly and try to solicit the word from him. Model "I want water" and reinforce his use of the sentence with praise and warmth.

Show him an object and a picture of the object cut from a magazine. Paste the picture on a paper sack so that he can carry through on an action. Say, "Orange. Put the orange with its picture" or "Put the orange in its bag."

Any object and its picture may be used (comb, spoon, cup, toothbrush). Give him one object and two pictures from which to choose--an orange and pictures of an orange and of a banana. Say, "Put the orange with its picture." Show him two pictures and ask him to point to one and then to the other. Say, "Show me the apple," and "now, show me the orange."

Give him two objects and two pictures and say, "Put the orange with its picture, and put the toothbrush with its picture" (or "in its bag").

Do the same with three pictures and three objects and, finally, with four pictures and three objects (three pictures matching objects and the fourth picture not matching).

Show him pictures in books and tell him their names. Then ask him, "What is this?" or "What do you call this?"

Start a scrapbook for him. Cut pictures from magazines and help him paste them into the book. If he cannot say the names of the pictures, give him two at a time; and while naming one, have him point to it.

Say, "Show me the dog." If he points to the dog, give it to him to paste into the book. Later on, when he is able to say words, give him the picture to paste only when he actually says the name; say, "This is a cat. What is This?" "Yes, a cat. Good. You may have the picture for your book." He will take great pride in his very own book and will react with pleasure to its use in subsequent lessons.

5. Introducing picture books (18 to 24 months)

After he is able to work with individual pictures, show him picture books. The first books should be simple and uncluttered, with a story involving only one major object; for example, The Apple Book or The Elephant Book. Talk only about the pictures and do not tell an involved story at first. Try to have him name the things he sees. When he gets older and understands more speech, read him simple stories from books.

6. Teaching the child to use elaborative language (18 months)

Extend the child's speech and encourage spontaneous speech in dramatic play, rhymes, songs, and other activities.

Use puppets with the child in telling stories and in acting out the stories.

Use a toy telephone to encourage speech.

Show him action pictures of children or adults (a woman sweeping, a child throwing a ball or gardening). Ask him, "What is the boy doing?" Tell him if he does not know, and then ask him again.

Teach him adverbs and adjectives by using them yourself and encouraging him to repeat your statement. "This car goes fast." "This is a red block."

Teach him the use of prepositions by using objects, parts of the body, and paper dolls. "Put the penny in the box, on the chair, between your toes." "Put the father in front of the mother, in back of the sister, beside the brother, between the mother and sister."

The following antonyms may be taught through simple play activities or through pictures.

Boy-Girl: brother, sister, pictures of children.

Cry-Laugh: dramatic play, looking in a mirror.

Up-Down: throwing the ball up and watching it fall down, playing Ring Around the Rosey (all fall down).

Full-Empty: filling glass with juice (full), drinking it (then it's empty).

Hard-Soft: touching sponge, stone, feather, cotton, wood.

Big-Little: cars, boxes, balls.

Open-Shut: (or Open-Close): book, box, pictures of items opened and closed.

Quiet-Loud: rhythm instruments, radio.

Slow-Fast: walking, running, playing with cars.

7. Encouraging internal dialogue (24 months)

Problem solving is simplified when under the control of internalized

language. The individual carries on an internal dialogue which differs from the speech he uses in communication. Teach the child to plan with words as he solves a problem. For example, when he is putting together a puzzle, you can say, "We start with the head; turn it around slowly until the piece will fit; put it in." Have the child say it with you as he completes the puzzle. After he learns to say it aloud, tell him to whisper it. And, still later tell him to say it to himself.

B. Concept Training

Concepts of body image, space, number, time, and classification were selected for emphasis in this training program because they are believed to be necessary prerequisites for academic learning and can be understood by children at an early age if appropriately presented.

1. Body image (14 months)

Body image is the mental picture one has of his own body and its parts at a given moment in time. The following activities may be used to help the child develop a clear and concise concept of body image:

Ask the child to point to his eye, nose, ear, etc. while looking into a mirror.

Ask the child to show you your ey and compare his eye as seen in a mirror.

Include other body parts in the same manner. Ask him to name parts of the body when he is able to talk.

Point to his eye and ask, "What is this?"

Let him eat fruit or a cookie while observing himself in the mirror.

Verbalize the words "tongue," "mouth," "teeth," and "chewing."

Tell the child to imitate your movement while looking in a mirror.

Blink your eyes, wave your hand, move your head.

Show him a doll or puppet and tell him to name the parts of the body.

Ask him to name parts of the body of people or animals while looking at pictures in a book. Ask, "Where is the dog's eye?"

Have him place his hand or foot on paper and draw an outline.

Let him color the picture.

Allow the child to lie down on a large piece of shelf paper. Trace an outline of his body with a magic marker. Put the picture on a wall with tape and have the child color the picture to match the colors of his clothing.

Draw a circle and ask the child to place eyes, nose, and mouth on the "face."

Draw a picture of a human figure with a distortion (arms coming from head instead of shoulders, mouth missing) and ask, "What is wrong with this picture."

Make a doll of felt pieces and have the child put the doll together on a felt board.

Sing action songs and have the child do the actions with you ("I Am Very Small, I Am Very Tall," "Put Your Finger on Your Nose, On Your Nose," "If You're Happy and You Know It, Clap Your Hands").

While lying on the floor, show the child how to stretch and relax to feel the muscles contract and relax.

While lying on the floor, have the child move both legs, both arms, one leg, one arm, left leg and left arm, left leg and right arm. He should keep arms and legs in contact with floor as he moves. Let him pretend that he is your mirror; he can imitate your movements (touch head, elbow, knee; blink eye; put out tongue).

Reverse roles; imitate his movements and become the child's mirror.

2. Space (10 months)

The infant is learning about things in space, about himself in space, and about space itself. The following activities will help this learning:

Put a toy close to him so that he can reach it easily. Then put the toy farther from him so that he has to reach with more effort.

Place two blocks on the table out of easy reach, one to his right and one to his left. He will learn to reach to either side of himself.

While holding him, put his bottle or toy on the table. Turn yourself and him away from it so that your back is toward the table.

See if he will turn himself around to see it.

While both of you are sitting on the floor facing each other, shake a small toy until his eyes are on it. Move it along the floor slowly until you push it behind your own back. See if he will crawl around you to find it.

Now move the toy along the floor until it is directly behind him. See if he will turn his body around to see the toy.

Arrange furniture so that he can creep through narrow and low spaces (between chairs, between couch and wall, under a low table).

He will learn how he relates to a given amount of space.

Place him near a staircase and place a toy on the second step.

In climbing to get the toy, he will learn about up and down and about depth, too.

Show him a picture upside down that he knows well. See if he will turn his head to see the picture upright. Turn the picture upright and then try the whole activity again.

Raise and lower him while you say "up, down;" he will enjoy this game and will learn the feeling of up and down.

Give him doughnut blocks to play with so that he will see and feel that there is an inside and an outside. Then give him a spindle upon which he may place the blocks.

Show him a stuffed animal with its face toward him. When he starts to reach for it, quickly turn it around so that he sees the back of the animal. When he takes it in his hand, watch him to see if he will turn it around to see the face again.

Put some small toys inside a cup and hand them to him. He will probably take them out one at a time and then put them back into the cup. Show him that he can turn the whole cup over and make the toys fall out all at once. Give him the toys in the cup again and see if he will then turn the entire cup over to get the toys out.

(a) More activities involving space (16 months)

Show him how to hang clothes on hooks and towels on rods. He will learn about up and down as well as learning how to hang things.

Give him a form box in which he can place cylinders into round holes and cubes into square holes, etc. Start with the cylinders; they will be the easiest to place. As he learns the task, add the other forms gradually. (Several toy companies make a box with five shapes: cylinder, cube, square, triangle, and arch. Be sure that you select a well-made toy for this activity; those made of wood are made with more precision and seem to be easier to place than those of plastic.)

(b) Introduce jigsaw puzzles. Start with three-piece puzzles and then add those which are more complicated.

Geometric shapes can be taught in freehand drawing with finger paints, water colors, crayons, and magic markers with which you and the child can make circles, squares, and triangles.

Use templates to trace circles, squares, and triangles.

Size can be easily taught by placing graduated rings upon a pyramid-shaped structure, the largest fitting on the bottom and the smallest on the top. Start with only three rings at first, and when the child learns to place these properly, give him additional rings for placement. Pieces of cardboard can be used for matching, identifying, and naming sizes--big, little, middle-sized.

(c) Introduce matching activities

Cut two circles out of grey or white cardboard, one twice the size of the other and place them on his table. Cut two more like the others and give him one in his hand and say, "Put this one with the one just like it." Or give him both and say, "Put the big one with the big one and the little one with the little one." (All should be the same color, so that you do not confuse teaching color with teaching size.)

Place one large and one small cardboard on the table and say, "Give me the big one," and "give me the little one."

Point to one of the cardboard circles and say, "Which one is this, the big one or the little one?" Later, use three sizes presented in the same manner: big, little and middle-sized.

(d) Introduce seriation.

Place nested cups or boxes in order. Start with only three cups which fit into each other easily; then add more.

(e) Teach the child to copy designs.

Three or four poker chips or buttons can be placed on a sheet of paper in various relationships to each other, making designs. Give the child an equal number of chips or buttons and a sheet of paper and ask him to copy your design.

The same idea can be used with pegboards, but start with simple designs.

3. Teaching number concepts

The child can start learning about numbers when quite young (about 14 months). Here are suggestions for activities:

Place pennies or bits of cereal on his table. Ask him for "one." Show him "one," if he doesn't respond. Then ask him for "more," or "many."

Play "one for me and one for you." Place two cups on the table, one in front of the child and the other in front of yourself. Tell the child to put one piece of cereal or a penny in his cup and then one in your cup until all the pennies or cereal bits are placed.

Give him two boxes and tell him to put one penny in each. Then show him how many are "two." and tell him to hold "two" in his fingers and then put two in each box. (He will not understand that "one" and then "one" more are "two" at first; he will see "two" only when they make a unit of two.) Since this task is difficult, it may be necessary to make up a story or game to play; such as, "Give Mother two pennies in her box; then give yourself two pennies in your box. Now, we'll go to the store and buy candy for you and Mother." Move the boxes to another corner of the table, and let him pretend to give the pennies to the storekeeper.

Teach the child to count by rote from 1 to 5 and later to 10. He will, of course, not know the meaning of the words, but he will understand that these are words used in counting.

Show him how to count the fingers on each hand.

Use counting songs and books with counting games.

Have the child count cookies or pieces of candy before eating them.

Teach the child to count blocks as he stacks them.

Cut numerals from cardboard or sandpaper and tell hime their names.

4. Time

Without a sense of the passage of time, a child will not be able to learn to "be on time" when he reaches school age. However, it is difficult to teach the concept of time. Even adults have difficulty with the concept.

Typically a child learns about time as he experiences an orderly sequence of events in a well-run home. He hears, "Time to get up," "Time for breakfast," "Time for play," "Time for nap," and "Time for Daddy to come home." As each day goes along similarly to the last one, he begins to feel a sense of the passage of time and of the order of daily events. The following suggestions may be used to teach the child about time:

Use the words "after" and "before" so that he can learn about the past, present, and future. "After you drink your milk, you may have the cookie." "You must take a nap before we go outdoors." "Now you can go outside."

Use the appropriate vocabulary to express time.

When he wants something and you are busy, say, "Just a minute" or "in a moment." He will learn that these words mean a short delay.

Relate events to the time of their occurrence:

"Time to eat," "Time to go home," "It is 10 o'clock and time for juice."

Use the words, "yesterday," "today," and "tomorrow." "Yesterday was a rainy day; today is a sunny day."

Use different tenses in talking to the child:

"I did it yesterday," "We went," "We'll do it."

Use comparative adjectives to indicate differences in amount of time needed for an activity:

"slower," "faster."

5. Classification

The child learns to understand his world better when he learns to put things into categories. The following activities are suggested to help the child learn about classification.

Color can be taught by first matching colors. Put a red sock on the child's foot and then show him one red and one blue sock and say, "Which one goes with the one on your foot?" You can try this activity before the child talks because it does not require speech. Use the three primary colors, red, blue, and yellow; allow him to choose from two colors to match the one on his foot.

Allow him to choose from three colors after he is successful with the above.

Place the sock on the foot of a doll and have the child match the color on the doll's foot.

Matching, identifying, and naming colors can be taught with colored cardboard chips.

Matching: Place two colored chips on the table (either red and blue, red and yellow, or blue and yellow). Give the child one of the colors and say, "Put this one with the one just like it." After he learns to choose from two colors, use three.

Identifying: Put two colors on the table and say, "Give me the red one" and "now give me the yellow one." This may take time to teach. It is much easier to match than to select the right one by name. Later, let the child choose from three colors.

Naming: Place the colors on the table and say, "What color is this one?"

Extend color lessons to the environment: Tell the child to point to or name colors of objects found in the home.

Sameness and Difference can be taught with pictures. Place two pictures on the table and ask the child to find one that is the same as the one in your hand. Then let him choose from three and then four pictures. Place three or four pictures, all alike but one, on the table and say, "Give me the one that is not like the others." ("Not like" is easier to understand than "different;" later use the word "different.")

Picture Classification can be taught by cutting out pictures from popular magazines. Very young children can sort people, dogs, cats, birds, foods, and other pictures. Paste a picture of a dog on the bottom of an opened box and a picture of a bird on another box. Give the child pictures of five dogs and five birds and say, "Put the dogs in the dog house and the birds in the birds' nest." (It is easier to give the child one picture at a time at first.) After he can sort five pictures of two categories, try 10 and then 15 pictures in each category. Change the categories for variety. Later increase the number of categories.

IV. Evaluation of the Infant Training Program

On the initial testing when the program was inaugurated, the infants were found to be average in intelligence and in motoric development but below their chronological age in language development, in interpretation of symbolic representation, and in conceptual development. The tutorial program described above was designed to ameliorate these deficits.

IQ

Variable	Experimental Group	Control Group	
Cattell (pretest)			
Mean Month CA	15.5	15.7	
Mean Month MA	15.3	15.2	Motor, language and representation were assessed with Fokes, Gesell--no formal scores available--concepts on Hunt-Uzgaris (experimental edition).
Mean IQ	98.8	98.4	
Binet (posttest)			
Mean Month CA	29.2	29.0	
Mean Month MA	32.7	29.2	
Mean IQ	108.1	98.8	

A summary of posttest data follows:

1. Although the groups were found to be comparable on pretest measures, the experimental group mean IQ on the Stanford-Binet at the posttest was 108.1 and that of the control group was 98.8, significant at the .05 level.
2. On postlanguage development tests--Illinois Test of Psycholinguistic Abilities (ITPA) and the language subtests of the Merrill-Palmer Scale of Mental Tests--the sample values of the experimental group were superior on all but one ITPA subtest. The .05 level of significance was reached on two subtests.
3. On all eight tests administered to assess conceptual development, the sample values of the experimental group were found to be consistently superior to those of the control group. Five of these tests differed at the .05 level of significance.
4. Seven tests were used to assess sensory-motor development. On all but one test the sample values of the experimental group only slightly exceeded those of the control group, thus confirming our assumption that culturally disadvantaged children are not deficient in motoric development. Statistically significant differences were found on only one of these tests.

V. Some Recommendations

Although much has been written in the field of child development describing the spontaneous intellectual growth of infants, little is to be found concerning either efforts or theories relative to consciously-sought and planned acceleration of language and cognitive growth. In view of the lack of previous studies of this latter nature and the lack of a comprehensive theory related to children at this level, it was necessary for this training program to utilize an almost completely eclectic approach with ideas drawn from child

development theory, common sense, trial and error, and even, in some cases, intuition. When we had doubts about any practices and procedures, they were dropped and replaced by activities suggested by the tutors and the writer, who served as program supervisor. It is hoped that the activities, materials, and procedures described in this paper may serve as guidelines for people who plan to work in the field of infant education.

The results of our study, although involving only 20 infants, strongly suggest that the activities and content of the tutorial program produced within the experimental group a rate of acceleration substantially greater than that of the control group. Extensions of the study, other than by replication or elaboration, might move in two or three directions. In the present study, little was done to involve mothers in the tutoring program. The primary purpose of the study was the development of a curriculum to be administered and assessed by professional teachers. One possible extension would be the organization of a program of instruction for mothers so that their child-rearing practices and daily conduct of the household would contribute to the intellectual growth of the child. One such research extension (Badger, 1969) is reported as having been very effective. The mothers, who attended weekly group meetings where they learned an infant education approach, teaching methods, and improved child rearing practices, were most enthusiastic. They applied the program at home in daily lessons and their infants have made educational gains.

Services to lower socioeconomic families are presently found in Parent-Child Centers established by the U.S. Office of Economic Opportunity and in other agencies. They now include programs of infant tutoring by outsiders and programs in which mothers are taught to teach their own infants. A third possibility exists for infant education in day care centers. Most day care centers do not admit children under the age of 2 1/2, but some are now beginning to realize the advisability of expanding their services to include

infants. Centers are also becoming aware of the need to take responsibility for stimulating and educating infants and young children, rather than giving infants mere custodial care. The procedures developed in this study may provide guidelines for inaugurating new services and extending old ones to include infant education.

An ultimate extension of our infant study would involve the actual extension of the Public School system into a subnursery program offering services to the entire community. The problem of logistics in home tutoring and its high cost point to the desirability of having the infants attend a central instructional facility where organized care and propitiously structured living routines would free the program of many typical problems existing in the disadvantaged home. The structured play activities described here can be carried on with several infants at a time. Infants attending such centers could be provided with opportunity for intellectual stimulation, constructive play, and socialization, as well as the necessary rest, nourishment, and warmth we have long associated with sound infant care.

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